

REMARKS

Reconsideration of the above-identified patent application in view of the amendments above and the remarks following is respectfully requested.

Claims 1-16 are in this case. Claims 1-13, 15 and 16 have been rejected under § 102(b). Claims 1, 13 and 14 have been rejected under § 102(e). Dependent claims 2-4, 6, 8 and 12 have been canceled. Independent claims 1, 15 and 16 and dependent claims 5, 7 and 9 have been amended. New independent claims 17-21 and 23 and new dependent claim 22 have been added.

The claims before the Examiner are directed toward an electronic module that includes electronic circuitry and first and second electrical connection mechanisms, both operationally connected to the electronic circuitry, for mounting the module on a printed circuit board by different respective methods. It suffices to mount the module using only one of the electrical connection mechanisms, either the first electrical connection mechanism or the second electrical connection mechanism, in order for the module to be fully operational.

§ 102(b) Rejections – Farnworth et al. ‘629

The Examiner has rejected claims 1-3, 5-13 and 16 under § 102(b) as being anticipated by Farnworth et al., US Patent No. 6,020,629 (henceforth, “Farnworth et al. ‘629”). The Examiner’s rejection is respectfully traversed.

Farnworth et al. ‘629 teach a semiconductor package 14 that includes several stacked substrates 12. Each substrate 12 includes a semiconductor die 20, each of whose die bond pads 34 is electrically connected to a contact pad 40 on the top side of substrate 12 and to an external contact 42 on the bottom side of substrate 12. Each

substrate 12 except the topmost substrate 12 is electrically connected via its contact pads 40 to external contacts 42 of the substrate 12 immediately above.

The Examiner has characterized substrates 12 of Farnworth et al. '629 as "printed circuit boards". Applicant continues to respectfully disagree with this characterization. Nevertheless, in order to expedite the prosecution, Applicant has amended independent claims 1 and 16 to further distinguish the present invention from the teachings of Farnworth et al. '629. Specifically, claims 1 and 16 have been amended to recite the limitation that mounting using either only the first connection mechanism or only the second connection mechanism suffices to render the electronic module fully operational. This is in contrast to Farnworth et al. '629 in which only the topmost substrate 12 is mounted using only external contacts 42. All the other substrates 12 are mounted using both contact pads 40 and external contacts 42. It follows that only external contacts 42, and not contact pads 40, constitute a connection mechanism such that mounting a substrate 12 using only that connection mechanism renders the substrate 12 fully operational.

Support for this amendment is found in the specification in electronic module 30 as illustrated in Figures 7-9. Electronic module 30 can be mounted on a printed circuit board either robotically, using BGA 1, or manually, using plug 2. Because the solder balls of BGA 1 are electrically connected to the pads of plug 2 by wires 7, it is inherent in module 30 that module 30 is fully operational whether mounted using only BGA 1 or only plug 2.

For consistency, and to clarify that the scope of the present invention does not exclude the electronic module being fully operational when mounted using both connection mechanisms, claim 15 has been amended to recite that mounting using only one of the connection mechanisms "suffices".

Independent claims 1 and 16 as presently amended certainly are not anticipated by Farnworth et al. '629. Furthermore, independent claims 1 and 16 as presently amended are not obvious from Farnworth et al. '629. There is neither a hint nor a suggestion in Farnworth et al. '629 of any need or utility to have a substrate 12 fully operational when mounted using either only external contacts 42 or only contact pads 40.

§ 102(b) Rejections – LaRue '430

The Examiner has rejected claims 1-4, 6, 13, 15 and 16 under § 102(b) as being anticipated by LaRue, US Patent No. 6,081,430 (henceforth, "LaRue '430"). The Examiner's rejection is respectfully traversed.

LaRue '430 teaches an active connector for a loop-through backplane. The active connector includes electronic circuitry (transceiver 7), a first connection mechanism (conductive elastomers 44) for mounting the active connector on a mother board 1 to connect line segments 2, and a second connection mechanism (card edge connector 37) into which a daughter board 6 is plugged. One aspect of the active connector of LaRue '430 that distinguishes the active connector of LaRue '430 from the present invention is that the active connector of LaRue '430, including transceiver 7, is fully operational only when daughter board 6 is plugged into card edge connector 37. The purpose of transceiver 7 is the same as in the prior art systems illustrated in Figures 2 and 3. As stated in column 1 lines 65-67,

The transceivers 7 relay signals between the components 8 on the daughter board 6 and the bus line 2.

In the absence of daughter board 6, transceiver 7 is inactive, and the active connector merely provides an electrical connection between two line segments 2 via conductive elastomers 44 and loop-through controlled impedance line 13. In other words, the

active connector of LaRue '430 lacks the limitation that mounting using only one of the connection mechanisms is needed to render the electronic module fully operational. Both connection mechanisms must be used to render the active connector of LaRue '430 fully operational. It follows that the present invention, as recited in independent claims 1, 15 and 16, is allowable over LaRue '430 even without the present amendments.

Because dependent claim 4 was rejected only over LaRue '430, claim 4 has been rewritten in independent form, as new claim 23, without the amendment described above to overcome Farnworth et al. '629. Correspondingly, claim 4 has been canceled.

§ 102(e) Rejections – Frame et al. '629

The Examiner has rejected claims 1, 13 and 14 under § 102(e) as being anticipated by Frame et al., US Patent No. 7,010,629 (henceforth, "Frame et al. '629"). The Examiner's rejection is respectfully traversed.

Because dependent claims 2, 3, 6, 8 and 12 were not rejected over Frame et al, '629, these claims have been rewritten in independent form, including the amendment described above to overcome Farnworth et al. '629, as new claims 17-21. Correspondingly, claims 2, 3, 6, 8 and 12 have been canceled, claim 5 has been amended to depend from claim 18, claim 7 has been amended to depend from claim 19 and claim 9 has been amended to depend from claim 20.

Frame et al. '629 teach a memory mezzanine **20** that includes electronic circuitry (memory repeater hub **21**) and two connection mechanisms (connectors **56** and **57**) for connecting memory devices **25** to memory mezzanine **20**. Memory mezzanine **20** of Frame et al. '629 lacks the limitation that the connection mechanisms are for mounting memory mezzanine **20** on a printed circuit board, as

“mounting on” is understood in the present invention. The meaning of “mounted on” according to the present invention is found in the specification in the description of the prior art on page 1 lines 20-24:

A typical PCB bears mounted thereon solid-state modules and passive modules that are interconnected by conductive wires imprinted on the PCB. Often, a smaller PCB is mounted as a module on a larger PCB.

page 6 lines 8-9:

The present invention is of an electronic module that can be mounted in a larger electronic device by one of two different methods. (emphasis added)

and page 8 lines 1-3:

...electronic module 30 may be any component, device or sub-assembly that requires operational connection to a larger electronic device... (emphasis added)

In other words, the electronic module of the present invention is subsidiary to the printed circuit board on which it is mounted. The opposite situation obtains in Frame et al. ‘629: memory devices **25** are subsidiary to memory mezzanine **20**. It follows that the present invention, as recited in independent claim 1, is allowable over Frame et al. ‘629 even without the present amendments. It then follows that claims 13 and 14 that depend from claim 1 also are allowable.

Applicant notes in passing that the same distinction may be made between the present invention and the active connector of LaRue ‘430: daughter board **6** is subsidiary to the active connector.

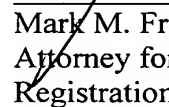
To further distinguish the present invention from the teachings of Frame et al. ‘629, new dependent claim 22 has been added. New claim 22 adds to claim 1 the limitation that one of the connection mechanisms is for mounting the electronic module on a printed circuit board by plugging the electronic module into the printed circuit board. This is in contrast to Frame et al. ‘629 in which memory devices **25** are

plugged into connectors **56** and **57** of memory mezzanine **20**. Support for new claim **22** is found in the specification in plug **2** of electronic module **30** that is for mounting electronic module **30** on a printed circuit board the way prior art electronic module **20** is mounted on a printed circuit board (page 2 lines 21-24):

Module **20** is mounted manually on a compatible PCB (not shown) by plugging plug **2** into a matching socket that is mounted on the PCB, thereby bringing each pad of plug **2** in contact with a matching electrically conducting pad in the socket.

In view of the above amendments and remarks it is respectfully submitted that independent claims 1, 15, 16-21 and 23, and hence dependent claims 5, 7, 9-11, 13, 14 and 22 are in condition for allowance. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,



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